



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5 CHICAGO REGIONAL LABORATORY  
536 SOUTH CLARK STREET  
CHICAGO, ILLINOIS 60605



**Date:** 10/25/2017

**Subject:** Review of Region 5 Data for U.S. Steel - Minntac Tailings Basin Area Facility

**To:** Water Division, WECA Region 5  
77 West Jackson Boulevard  
Chicago, IL 60604

**From:** Kathleen Swan, Analyst  
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with the EPA QA/G-8 *Guidance on Environmental Data Verification and Data Validation* and the U.S. EPA Region 5 RMD QMP, CRL performs data verification on all the data generated internally. CRL does not perform data validation or quality assessment procedures.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X \_\_\_\_\_

Please contact the analyst with any technical report issues, Robert Thompson at (312)-353-9078 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

**Attached are Results for: U.S. Steel - Minntac Tailings Basin Area Facility**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Data Coordinator and Date Transmitted

**Analyses included in this report:**

|                  |                    |            |
|------------------|--------------------|------------|
| Ca ICP (W)       | Metals ICP-AES (w) | Mg ICP (W) |
| Hardness by calc |                    |            |



Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

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Water Division, WECA Region 5  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

## ANALYSIS CASE NOTES

### General Information

| Work Order | Number of Samples | Date Received |
|------------|-------------------|---------------|
| 1709003    | 16                | 09 14 17      |

All holding times were met. Analyst K Swan 312 353 9071.

Sample preparation was performed using CRL SOP Metals 025, Version No. 3, based on EPA sample preparation procedure 200.2 and analysis was performed using CRL SOP Metals003, Version 6, based on EPA ICP Method 200.7/SW-846 6010D. Supporting documents filed with 1708008.

### Sample Analysis and Results

The data reported herein meet the requirements referenced in the SOP used for analysis and any laboratory specifications stated in the *Quality Assurance Project Plan/Sampling Plan for Environmental Compliance Assessment for U.S. Steel – Minntac Tailings Basin Area Facility* dated August 2017, with the exception that laboratory reporting limit for hardness is 1.32 mg CaCO<sub>3</sub>/L, which is greater than the 1.00 mg CaCO<sub>3</sub>/L mentioned in above requirements.

Iron is reported from 273 line and aluminum is reported from 308 line due to QC recoveries.

### Quality Control

All quality control (QC) audits were within CRL limits or did not result in qualification of the data, with the following exceptions:

Calcium (and therefore hardness) is flagged J due to various QC recovery issues  
Phosphorous is flagged L for 1709003-09 due to possible spectral interference



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**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID | Laboratory ID | Matrix | Date Sampled    | Date Received   |
|-----------|---------------|--------|-----------------|-----------------|
| S01       | 1709003-01    | Water  | Sep-12-17 09:57 | Sep-14-17 13:26 |
| S02       | 1709003-02    | Water  | Sep-12-17 10:23 | Sep-14-17 13:26 |
| S03       | 1709003-03    | Water  | Sep-12-17 10:50 | Sep-14-17 13:26 |
| S04       | 1709003-04    | Water  | Sep-12-17 11:08 | Sep-14-17 13:26 |
| D05       | 1709003-05    | Water  | Sep-12-17 11:08 | Sep-14-17 13:26 |
| S06       | 1709003-06    | Water  | Sep-12-17 11:30 | Sep-14-17 13:26 |
| S07       | 1709003-07    | Water  | Sep-12-17 11:51 | Sep-14-17 13:26 |
| S08       | 1709003-08    | Water  | Sep-12-17 14:03 | Sep-14-17 13:26 |
| S09       | 1709003-09    | Water  | Sep-12-17 15:00 | Sep-14-17 13:26 |
| S10       | 1709003-10    | Water  | Sep-12-17 15:15 | Sep-14-17 13:26 |
| S11       | 1709003-11    | Water  | Sep-13-17 09:44 | Sep-14-17 13:26 |
| S12       | 1709003-12    | Water  | Sep-13-17 09:49 | Sep-14-17 13:26 |
| S13       | 1709003-13    | Water  | Sep-13-17 09:55 | Sep-14-17 13:26 |
| S14       | 1709003-14    | Water  | Sep-13-17 10:23 | Sep-14-17 13:26 |
| S15       | 1709003-15    | Water  | Sep-13-17 11:10 | Sep-14-17 13:26 |
| R16       | 1709003-16    | Water  | Sep-13-17 12:52 | Sep-14-17 13:26 |



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**Metals by ICP-AES using EPA 200.7 (modified)**  
**US EPA Region 5 Chicago Regional Laboratory**

**S01 (1709003-01)**

**Matrix: Water**

**Sampled: Sep-12-17 09:57**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B17I021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.142  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 63.0   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.917  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 156    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 4.97   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 19.3   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S02 (1709003-02)**

**Matrix: Water**

**Sampled: Sep-12-17 10:23**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B17I021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.222  |                       |     | 0.0500             | "     | "        | "       | "         | "         |
| Calcium    | 86.5   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | U      |                       |     | 0.0800             | "     | "        | "       | "         | Oct-17-17 |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | Oct-17-17 |
| Magnesium  | 233    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 11.8   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 27.3   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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**S03 (1709003-03)**

**Matrix: Water**

**Sampled: Sep-12-17 10:50**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.318  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 161    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.188  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 289    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 16.6   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 70.2   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S04 (1709003-04)**

**Matrix: Water**

**Sampled: Sep-12-17 11:08**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.244  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 146    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.141  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 277    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 16.6   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 68.7   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

**D05 (1709003-05)**

**Matrix: Water**

**Sampled: Sep-12-17 11:08**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.243  |                       |     | 0.0500             | "     | "        | "       | "         | "         |
| Calcium    | 147    | J                     |     | 0.200              | "     | "        | "       | "         | "         |
| Iron       | 0.101  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 279    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 16.6   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 69.2   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | Oct-17-17 |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | Oct-17-17 |

**S06 (1709003-06)**

**Matrix: Water**

**Sampled: Sep-12-17 11:30**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.297  |                       |     | 0.0500             | "     | "        | "       | "         | "         |
| Calcium    | 163    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.212  |                       |     | 0.0800             | "     | "        | "       | "         | Oct-17-17 |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | Oct-17-17 |
| Magnesium  | 279    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 12.4   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 59.1   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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**Metals by ICP-AES using EPA 200.7 (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

**S07 (1709003-07)**

**Matrix: Water**

**Sampled: Sep-12-17 11:51**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.261  |                       |     | 0.0500             | "     | "        | "       | "         | "         |
| Calcium    | 47.1   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.382  |                       |     | 0.0800             | "     | "        | "       | "         | Oct-17-17 |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | Oct-17-17 |
| Magnesium  | 228    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 4.38   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 10.8   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S08 (1709003-08)**

**Matrix: Water**

**Sampled: Sep-12-17 14:03**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | U      |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 12.6   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 1.76   |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 6.95   |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 1.58   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 3.02   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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**S09 (1709003-09)**

**Matrix: Water**

**Sampled: Sep-12-17 15:00**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | 0.431  |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.129  |                       |     | 0.0500             | "     | "        | "       | "         | "         |
| Calcium    | 174    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 35.1   |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 188    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | 0.277  | L                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 5.79   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 72.1   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | 0.006  |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S10 (1709003-10)**

**Matrix: Water**

**Sampled: Sep-12-17 15:15**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.193  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 175    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | U      |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 216    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 7.07   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 60.4   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |





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**US EPA Region 5 Chicago Regional Laboratory**

**S11 (1709003-11)**

**Matrix: Water**

**Sampled: Sep-13-17 09:44**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.232  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 136    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.759  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 230    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 20.1   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 70.8   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S12 (1709003-12)**

**Matrix: Water**

**Sampled: Sep-13-17 09:49**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.186  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 122    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 6.25   |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 232    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 19.3   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 71.6   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

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Water Division, WECA Region 5  
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Chicago IL, 60604

Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

**S13 (1709003-13)**

**Matrix: Water**

**Sampled: Sep-13-17 09:55**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.230  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 130    | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 1.70   |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 225    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 18.9   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 68.6   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**S14 (1709003-14)**

**Matrix: Water**

**Sampled: Sep-13-17 10:23**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.0938 |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 30.9   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.425  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 110    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 5.93   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 9.70   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

**S15 (1709003-15)**

**Matrix: Water**

**Sampled: Sep-13-17 11:10**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | 0.163  |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | 61.1   | J                     |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | 0.187  |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | 201    |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | 9.33   |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | 21.6   |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |

**R16 (1709003-16)**

**Matrix: Water**

**Sampled: Sep-13-17 12:52**

**Received: Sep-14-17 13:26**

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|------------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  | 1        | B171021 | Sep-20-17 | Oct-17-17 |
| Boron      | U      |                       |     | 0.0500             | "     | "        | "       | "         | Oct-17-17 |
| Calcium    | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Iron       | U      |                       |     | 0.0800             | "     | "        | "       | "         | "         |
| Lithium    | U      |                       |     | 0.0250             | "     | "        | "       | "         | "         |
| Magnesium  | U      |                       |     | 0.200              | "     | "        | "       | "         | "         |
| Phosphorus | U      |                       |     | 0.200              | "     | "        | "       | "         | Oct-17-17 |
| Potassium  | U      |                       |     | 0.800              | "     | "        | "       | "         | Oct-17-17 |
| Sodium     | U      |                       |     | 0.400              | "     | "        | "       | "         | "         |
| Tin        | U      |                       |     | 0.0200             | "     | "        | "       | "         | Oct-17-17 |
| Titanium   | U      |                       |     | 0.006              | "     | "        | "       | "         | "         |
| Vanadium   | U      |                       |     | 0.005              | "     | "        | "       | "         | "         |



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Hardness by Calculation**  
**US EPA Region 5 Chicago Regional Laboratory**

**S01 (1709003-01) Matrix: Water Sampled: Sep-12-17 09:57 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 799    | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S02 (1709003-02) Matrix: Water Sampled: Sep-12-17 10:23 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1170   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S03 (1709003-03) Matrix: Water Sampled: Sep-12-17 10:50 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1590   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S04 (1709003-04) Matrix: Water Sampled: Sep-12-17 11:08 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1510   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**D05 (1709003-05) Matrix: Water Sampled: Sep-12-17 11:08 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1510   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S06 (1709003-06) Matrix: Water Sampled: Sep-12-17 11:30 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1560   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S07 (1709003-07) Matrix: Water Sampled: Sep-12-17 11:51 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1060   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S08 (1709003-08) Matrix: Water Sampled: Sep-12-17 14:03 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 60.0   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S09 (1709003-09) Matrix: Water Sampled: Sep-12-17 15:00 Received: Sep-14-17 13:26**



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Hardness by Calculation**  
**US EPA Region 5 Chicago Regional Laboratory**

**S09 (1709003-09) Matrix: Water Sampled: Sep-12-17 15:00 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1210   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S10 (1709003-10) Matrix: Water Sampled: Sep-12-17 15:15 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1330   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S11 (1709003-11) Matrix: Water Sampled: Sep-13-17 09:44 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1290   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S12 (1709003-12) Matrix: Water Sampled: Sep-13-17 09:49 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1260   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S13 (1709003-13) Matrix: Water Sampled: Sep-13-17 09:55 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 1250   | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S14 (1709003-14) Matrix: Water Sampled: Sep-13-17 10:23 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 530    | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**S15 (1709003-15) Matrix: Water Sampled: Sep-13-17 11:10 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | 981    | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |

**R16 (1709003-16) Matrix: Water Sampled: Sep-13-17 12:52 Received: Sep-14-17 13:26**

| Analyte  | Result | Flags /<br>Qualifiers | MDL   | Reporting<br>Limit | Units      | Dilution | Batch  | Prepared  | Analyzed  |
|----------|--------|-----------------------|-------|--------------------|------------|----------|--------|-----------|-----------|
| Hardness | U      | J                     | 0.114 | 1.32               | mg CaCO3/L | 1        | [CALC] | Sep-20-17 | Oct-17-17 |



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B17I021 - Hot Block Digestion**

Blank (B17I021-BLK1)

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | %REC<br>Limits | RPD | RPD<br>Limit |
|------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  |                |                  |      |                |     |              |
| Boron      | U      |                       |     | 0.0500             | "     |                |                  |      |                |     |              |
| Calcium    | U      |                       |     | 0.200              | "     |                |                  |      |                |     |              |
| Iron       | U      |                       |     | 0.0800             | "     |                |                  |      |                |     |              |
| Lithium    | U      |                       |     | 0.0250             | "     |                |                  |      |                |     |              |
| Magnesium  | U      |                       |     | 0.200              | "     |                |                  |      |                |     |              |
| Phosphorus | U      |                       |     | 0.200              | "     |                |                  |      |                |     |              |
| Potassium  | U      |                       |     | 0.800              | "     |                |                  |      |                |     |              |
| Sodium     | U      |                       |     | 0.400              | "     |                |                  |      |                |     |              |
| Tin        | U      |                       |     | 0.0200             | "     |                |                  |      |                |     |              |
| Titanium   | U      |                       |     | 0.006              | "     |                |                  |      |                |     |              |
| Vanadium   | U      |                       |     | 0.005              | "     |                |                  |      |                |     |              |

LCS (B17I021-BS1)

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC  | %REC<br>Limits | RPD | RPD<br>Limit |
|------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|-------|----------------|-----|--------------|
| Aluminum   | 0.968  |                       |     | 0.200              | mg/L  | 1.000          |                  | 96.8% | 85-115         |     |              |
| Boron      | 1.01   |                       |     | 0.0500             | "     | 1.000          |                  | 101%  | 85-115         |     |              |
| Calcium    | 47.8   |                       |     | 0.200              | "     | 50.00          |                  | 95.7% | 85-115         |     |              |
| Iron       | 0.992  |                       |     | 0.0800             | "     | 1.000          |                  | 99.2% | 85-115         |     |              |
| Lithium    | 0.0950 |                       |     | 0.0250             | "     | 0.1000         |                  | 95.0% | 85-115         |     |              |
| Magnesium  | 18.7   |                       |     | 0.200              | "     | 20.00          |                  | 93.5% | 85-115         |     |              |
| Phosphorus | 1.02   |                       |     | 0.200              | "     | 1.000          |                  | 102%  | 85-115         |     |              |
| Potassium  | 23.2   |                       |     | 0.800              | "     | 25.00          |                  | 92.8% | 85-115         |     |              |
| Sodium     | 46.5   |                       |     | 0.400              | "     | 50.00          |                  | 93.1% | 85-115         |     |              |



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Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified) - Quality Control**

**US EPA Region 5 Chicago Regional Laboratory**

**Batch B17I021 - Hot Block Digestion**

LCS (B17I021-BS1)

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte  | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC  | %REC<br>Limits | RPD | RPD<br>Limit |
|----------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|-------|----------------|-----|--------------|
| Tin      | 0.488  |                       |     | 0.0200             | mg/L  | 0.5000         |                  | 97.5% | 85-115         |     |              |
| Titanium | 0.0960 |                       |     | 0.006              | "     | 0.1000         |                  | 96.0% | 85-115         |     |              |
| Vanadium | 0.105  |                       |     | 0.005              | "     | 0.1000         |                  | 105%  | 85-115         |     |              |

Duplicate (B17I021-DUP1)

Source: 1709003-04

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | %REC<br>Limits | RPD    | RPD<br>Limit |
|------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|--------|--------------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  |                | U                |      |                |        | 20           |
| Boron      | 0.238  |                       |     | 0.0500             | "     |                | 0.244            |      |                | 2.22   | 20           |
| Calcium    | 146    |                       |     | 0.200              | "     |                | 146              |      |                | 0.0530 | 20           |
| Iron       | 0.141  |                       |     | 0.0800             | "     |                | 0.141            |      |                | 0.309  | 20           |
| Lithium    | 0.0046 |                       |     | 0.0250             | "     |                | 0.0043           |      |                | 6.77   | 20           |
| Magnesium  | 277    |                       |     | 0.200              | "     |                | 277              |      |                | 0.118  | 20           |
| Phosphorus | U      |                       |     | 0.200              | "     |                | U                |      |                |        | 20           |
| Potassium  | 16.4   |                       |     | 0.800              | "     |                | 16.6             |      |                | 0.929  | 20           |
| Sodium     | 68.7   |                       |     | 0.400              | "     |                | 68.7             |      |                | 0.0342 | 20           |
| Tin        | 0.0051 | Q                     |     | 0.0200             | "     |                | 0.0039           |      |                | 25.0   | 20           |
| Titanium   | U      |                       |     | 0.006              | "     |                | U                |      |                |        | 20           |
| Vanadium   | 0.0012 |                       |     | 0.005              | "     |                | 0.0011           |      |                | 11.9   | 20           |

Duplicate (B17I021-DUP2)

Source: 1709003-11

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | %REC<br>Limits | RPD  | RPD<br>Limit |
|------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|------|--------------|
| Aluminum   | U      |                       |     | 0.200              | mg/L  |                | U                |      |                |      | 20           |
| Boron      | 0.229  |                       |     | 0.0500             | "     |                | 0.232            |      |                | 1.46 | 20           |
| Calcium    | 132    |                       |     | 0.200              | "     |                | 136              |      |                | 3.51 | 20           |
| Iron       | 0.736  |                       |     | 0.0800             | "     |                | 0.759            |      |                | 3.17 | 20           |
| Lithium    | 0.0043 |                       |     | 0.0250             | "     |                | 0.0049           |      |                | 13.4 | 20           |
| Magnesium  | 241    |                       |     | 0.200              | "     |                | 230              |      |                | 4.97 | 20           |
| Phosphorus | U      |                       |     | 0.200              | "     |                | U                |      |                |      | 20           |
| Potassium  | 19.6   |                       |     | 0.800              | "     |                | 20.1             |      |                | 2.75 | 20           |





Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

536 South Clark Street, Chicago, IL 60605  
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, WECA Region 5  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: U.S. Steel - Minntac Tailings Basin Area Facility  
Project Number: 02DM17  
Project Manager: Dean Maraldo

**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B17I021 - Hot Block Digestion**

| Duplicate (B17I021-DUP2) |        |                       |     | Source: 1709003-11 |       |                |                  | Prepared: Sep-20-17 Analyzed: Oct-17-17 |                |      |              |
|--------------------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|---|----------------|------|--------------|
| Analyte                  | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC                                    | %REC<br>Limits | RPD  | RPD<br>Limit |
| Sodium                   | 68.4   |                       |     | 0.400              | mg/L  |                | 70.8             |   |                | 3.53 | 20           |
| Tin                      | 0.0043 | Q                     |     | 0.0200             | "     |                | 0.0034           |   |                | 24.9 | 20           |
| Titanium                 | U      |                       |     | 0.006              | "     |                | U                |   |                |      | 20           |
| Vanadium                 | 0.0016 | Q                     |     | 0.005              | "     |                | 0.0012           |   |                | 28.1 | 20           |

| Matrix Spike (B17I021-MS1) |        |                       |     | Source: 1709003-04 |       |                |                  | Prepared: Sep-20-17 Analyzed: Oct-17-17 |                |     |              |
|----------------------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|---|----------------|-----|--------------|
| Analyte                    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC                                    | %REC<br>Limits | RPD | RPD<br>Limit |
| Aluminum                   | 1.00   |                       |     | 0.200              | mg/L  | 1.000          | U                | 100%                                    | 75-125         |     |              |
| Boron                      | 1.29   |                       |     | 0.0500             | "     | 1.000          | 0.244            | 105%                                    | 75-125         |     |              |
| Calcium                    | 192    |                       |     | 0.200              | "     | 50.00          | 146              | 91.6%                                   | 75-125         |     |              |
| Iron                       | 1.13   |                       |     | 0.0800             | "     | 1.000          | 0.141            | 98.5%                                   | 75-125         |     |              |
| Lithium                    | 0.102  |                       |     | 0.0250             | "     | 0.1000         | 0.0043           | 97.7%                                   | 75-125         |     |              |
| Magnesium                  | 297    |                       |     | 0.200              | "     | 20.00          | 277              | 101%                                    | 75-125         |     |              |
| Phosphorus                 | 1.10   |                       |     | 0.200              | "     | 1.000          | U                | 110%                                    | 75-125         |     |              |
| Potassium                  | 40.5   |                       |     | 0.800              | "     | 25.00          | 16.6             | 95.6%                                   | 75-125         |     |              |
| Sodium                     | 117    |                       |     | 0.400              | "     | 50.00          | 68.7             | 97.0%                                   | 75-125         |     |              |
| Tin                        | 0.497  |                       |     | 0.0200             | "     | 0.5000         | 0.0039           | 98.5%                                   | 75-125         |     |              |
| Titanium                   | 0.0841 |                       |     | 0.006              | "     | 0.1000         | U                | 84.1%                                   | 75-125         |     |              |
| Vanadium                   | 0.106  |                       |     | 0.005              | "     | 0.1000         | 0.0011           | 105%                                    | 75-125         |     |              |

| Matrix Spike (B17I021-MS2) |        |                       |     | Source: 1709003-11 |       |                |                  | Prepared: Sep-20-17 Analyzed: Oct-17-17 |                |     |              |
|----------------------------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|---|----------------|-----|--------------|
| Analyte                    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC                                    | %REC<br>Limits | RPD | RPD<br>Limit |
| Aluminum                   | 0.981  |                       |     | 0.200              | mg/L  | 1.000          | U                | 98.1%                                   | 75-125         |     |              |
| Boron                      | 1.28   |                       |     | 0.0500             | "     | 1.000          | 0.232            | 105%                                    | 75-125         |     |              |
| Calcium                    | 178    |                       |     | 0.200              | "     | 50.00          | 136              | 82.7%                                   | 75-125         |     |              |
| Iron                       | 1.74   |                       |     | 0.0800             | "     | 1.000          | 0.759            | 97.8%                                   | 75-125         |     |              |
| Lithium                    | 0.101  |                       |     | 0.0250             | "     | 0.1000         | 0.0049           | 96.0%                                   | 75-125         |     |              |
| Magnesium                  | 242    | Q                     |     | 0.200              | "     | 20.00          | 230              | 60.6%                                   | 75-125         |     |              |
| Phosphorus                 | 1.07   |                       |     | 0.200              | "     | 1.000          | U                | 107%                                    | 75-125         |     |              |



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**Reported:**  
Oct-25-17 14:39

**Metals by ICP-AES using EPA 200.7 (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B17I021 - Hot Block Digestion**

Matrix Spike (B17I021-MS2)

Source: 1709003-11

Prepared: Sep-20-17 Analyzed: Oct-17-17

| Analyte   | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC  | %REC<br>Limits | RPD | RPD<br>Limit |
|-----------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|-------|----------------|-----|--------------|
| Potassium | 43.9   |                       |     | 0.800              | mg/L  | 25.00          | 20.1             | 95.3% | 75-125         |     |              |
| Sodium    | 116    |                       |     | 0.400              | "     | 50.00          | 70.8             | 91.3% | 75-125         |     |              |
| Tin       | 0.496  |                       |     | 0.0200             | "     | 0.5000         | 0.0034           | 98.6% | 75-125         |     |              |
| Titanium  | 0.0864 |                       |     | 0.006              | "     | 0.1000         | U                | 86.4% | 75-125         |     |              |
| Vanadium  | 0.105  |                       |     | 0.005              | "     | 0.1000         | 0.0012           | 104%  | 75-125         |     |              |



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**Reported:**  
Oct-25-17 14:39

**Notes and Definitions**

- L The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.
- J The identification of the analyte is acceptable; the reported value is an estimate.
- U Not Detected
- NR Not Reported
- Q QC limit Exceeded